ANACAPA ISLAND RESTORATION PROJECT

CHAPTER THREE

AFFECTED ENVIRONMENT

Chapter Contents

Introduction

This chapter focuses on portions of the environment that are directly related to conditions addressed in the alternatives. The description of the affected environment is not meant to be a complete description of the project area. Rather, it is intended to portray the significant conditions and trends of the resources that may be affected by the proposed project or its alternatives. Information in this chapter is based primarily on the Natural Resources Study conducted in 1979 by the Santa Barbara Museum of Natural History, inventory and monitoring data from the Park's resource management staff, independent research studies, and studies conducted as part of this proposed action. Other sources are noted where applicable.

This chapter is organized into four sections, which when taken together provide the most complete description of the island resources, including the human element. The four major components of this chapter are:

- Physical Environment
- Marine Environment
- Terrestrial Environment
- Human Uses and Values.

For the most part, geologic and climatological conditions, processes, and disturbances cannot be altered by management activities. Watershed, soil, and atmosphere conditions and processes, also part of the physiographic setting, can be modified by certain management activities. However, the management activities that are proposed in this analysis would not affect the physiographic settings.

Physical Environment

Setting

Off the coast of Southern California, eight ridges in the continental shelf rise above sea level, forming a series of islands. The four northern islands are located in the Santa Barbara Channel parallel to the coast south of Point Conception: the four southern islands are scattered offshore between Los Angeles and the Mexican border.

The Channel Islands vary greatly in size, distance from each other, and distance to from the mainland, creating an immense natural laboratory of isolation and evolution. Because the islands have escaped much of the historical human impact on coastal California, they provide an ideal place for a National Park.

Of all the Channel Islands, the smallest and closest to the mainland is Anacapa Island. Totaling 296 ha, Anacapa Island with its three islets (East, Middle, and West) is just over 1 square mile in area. One of the northern Channel Islands, it lies southwest of the City of Ventura, 9 miles across the Santa Barbara Channel from the nearest mainland point.

Geology

(Adapted from Gustafson, 1999) The Channel Islands are but exposed peaks in a topographically complex area of submarine basins and ridges known as the Continental Borderland. This has been a region of intense geological activity – including crustal deformation, volcanism, faulting, uplift, and erosion – caused by local tectonic processes.

The deep wrinkles of today's Boderland began to form in a previously broad continental shelf during the Oligocene epoch (30 million years ago) in response to stress at the boundary of the North American and oceanic plates. Widespread volcanic activity both on and off shore followed in the Miocene epoch (24 to 7 million years ago), as the Farallon Plate was subducted under the continental shelf.

Among the ranges created by this tectonic activity was the Santa Monica Mountains Range, which originally ran north and south. By the end of the Miocene, however, this range had rotated into its present east-to-west orientation, as had several other mountain chains now known collectively as the Transverse Ranges. The four northern Channel Islands, including Anacapa Island, constitute the seaward extension of the Santa Monica Mountains, which rise in downtown Los Angeles, plunge into the ocean at Point Mugu, and continue westward for many miles.

During the Pleistocene ice ages, sea levels dropped enough for the four northern islands to form a single, vast island now known as *Santarosae.* For decades, scientist assumed that a landbridge once connected Santarosae to the mainland range as well. But as bathymetric knowledge of the ocean floor improved, geologists concluded that even during periods of lowest sea levels (about 17 thousand years ago), the connection between the mainland and Santarosae remained submerged. As glaciers melted at the close of the Pleistocene, rising sea levels flooded lower elevations of Santarosae, leaving the higher regions exposed and separated.

Anacapa Island is mostly made up of volcanics, miocene basalts, andesites, and breccias formed largely by underwater eruptions 15-20 million years ago.

Geologic reconnaissance conducted by Johnson (1979) on Anacapa Island described the bedrock geology, quaternary marine terraces and sediments, and quaternary terrestrial sediments.

Bedrock Geology

The bedrock geology of Anacapa Island is comprised of dark colored Miocene Conejo volcanics with some modest to significant interbeds of lighter-colored San Onofre Breccia, also of Miocene age. Some of the basalt is of the pillow type indicating submarine eruptions. Various joints, faults, and fractures are seen in the sea cliffs about the island and where these intersect the sea, sea caves have formed. Scholl (1960) concluded that Anacapa has tilted to the northward as a unit in the Late Pleistocene or Holocene. This tilt is very apparent on each of the three islets.

Quaternary Marine Terraces and Sediments

Quaternary marine terraces and sediments occur at various elevations, the most conspicuous of which is the 250-ft. terrace which dominates the mesa-like form of Middle and East Islets. These have been described by several authors (Scholl 1960; Lipps 1964), and occur at 25 and 250 feet elevations. During the geological reconnaissance associated with the present study, beach deposits were found at 25, 250, 650, 800, and 840 ft.

Marine sediments occur on all three islets but have been preserved best on Middle and West Islets. On Middle Islet, however, fosssiliferous terrace deposits occur at 25-ft.

elevation, and a marine unit some 2.5 – 4.5 feet thick veneers at the 250-foot terrace.

Quaternary Terrestrial Sediment

Quaternary terrestrial sediments are thin on East Islet, ranging from 0 –8 ft. thick, but on Middle and West Islets range up to 15 – 50 feet thick respectively. At the boat landing at the east-end of West Islet a terrestrial unit occurs which has yielded many remains of birds, at least one of which is extinct.

Soils

Soil information on Anacapa Island is known from a reconnaissance survey conducted by Johnson (1979). From eight hand-dug pits and soil lab analysis it was determined that the Island has three major soil types.

Lithic Xerorthents – soils found on moderately steep to steep recent erosional slopes.

Typic Chromoxererts – clayey, poorly horizonated soils that shrink and crack during summers and swell when wetted during winters. Found on gentle to moderate slopes on all three islets.

Vertic Argixerolls – clayey, organic matter-rich soils that have shrink-swell characteristics such that it forms significant cracks in summer. Found on the gentlest and flattest portions on all three islets.

Status and Trend

Determination of the status or trend of soil resource conditions for Anacapa Island is difficult because of the lack of monitoring data. Generally, declines in soil quality and productivity are associated with intensive vegetation management activities, roading, and grazing. Prior to becoming a National Monument in 1938, all three islets had been grazed primarily by sheep. East Islet had sheep grazing between 1902-1912, and Middle and West Islets were grazed from 1902-1937 (Johnson 1979). It is estimated that soil resources were significantly affected during this period, but has since recovered. However, to varying extents the islets have been invaded by alien grass and forb species. The impacts to soil resources as a result of these invasive species are not known.

Cyanobacterial crusts

Cyanobacterial crusts are important for increased soil stability, water infiltration, and fertility of soils. Cyanobacterial crusts are common on the Channel Islands. Surveys done by Belnap (1994) indicate that cyanobacterial crusts should cover the soil surfaces in most of the vegetation types found in the Channel Islands.

These soil crusts are impacted by soil surface disturbance, including grazing, people and off-road vehicles. The only opportunity currently for these crusts to be disturbed on Anacapa Island is through trampling by people.

Although restricted to hiking trails on East Anacapa Islet, authorized activities such as iceplant removal and terrestrial animal monitoring, as well as unauthorized trampling by errant hikers may impact these crusts. Middle and West Islets receive minimal foot traffic.

Climate

Precipitation and Temperature

The Channel Islands enjoy the Mediterranean climate typical of the central

California coast. Rain pelts the islands off and on from November to March, but is scarce from late May to October, when a stable Pacific high-pressure system settles off the coast. A shallow coastal marine layer helps ameliorate summer drought conditions on the islands in all but the driest of years.

Northwesterly winds blow throughout the year, picking up speed most afternoons and dropping off at night. These winds drive fog against the islands' northwestern slopes, which provide very different climatic conditions than the south-facing coastal slopes of the mainland. Santa Ana winds occasionally disrupt this pattern, particularly in the fall and early winter. These hot dry winds blow from the east when high-pressure systems are present of the interior mainland.

Drought

Drought is an important process that affects ecosystems. Drought is defined as an absence of usual precipitation (less than 75 percent of normal), for a long enough period that there is decreased soil moisture and stream flow, thereby affecting ecological processes and human activities. Drought conditions occur frequently on Anacapa Island.

Air Quality *(Clean Air Act)*

Current Status and Trend

The history of air quality monitoring on the Channel Islands goes back to the period of 1988-1992 when a air quality station was located on East Anacapa Island. This station monitored ozone, sulfur dioxide, hydrocarbons, and nitrogen oxides. This station was removed when the Coast Guard converted the Anacapa lighthouse to solar power, and removed the power supply for the air quality station. In 1996, in cooperation with the Santa Barbara County Air Pollution Control District, an ozone monitoring station was built on Santa Rosa Island.

It is probable that the combination of prevailing wind patterns, a low natural fire history, and small human populations has

Table 4. Anacapa Island-Lighthouse 1992 Ozone Summary (Ventura County Air Pollution Control District)

Year	% of Days Moni-tored	Number of Days Standard Exceeded			1-hr Ozone Concentrations ppm					8-hr Ozone Concentrations ppm		
		State 1-hour	Federal 1-hour	Federal 8-hour**	1st High	2nd High	3rd High	4th High	EPDC*	1st High	2nd High	3rd High
1992	67%	4	0	2	0.100	0.100	0.100	0.100	0.102	0.094	0.090	0.081

*The Expected Peak Day Concentration (EPDC) is calculated based on data for 3 successive years, listed by the last year of the three year period. The EPDC represents the ozone concentration expected to occur once per year.
**Proposed Federal Standard

allowed for generally good air quality on the island. Following the population and development boom along coastal southern California, however, poor air quality is widespread, and smog often mars the visibility from and around the islands.

The phenomenon of "Santa Ana" winds that come from a northeasterly, inland direction can greatly affect air quality at Anacapa Island. These winds usually occur during fall and winter and are characteristically warm and dry and may be of very high velocity near the mainland shore. They primarily affect those islands close to the mainland by carrying out to sea the air pollution usually found onshore. Satellite images show that Santa Ana winds can carry pollutants several hundred miles offshore and have the potential to negatively affect all of the park islands. A bigger concern relative to air pollutants in the Channel Islands is a "Catalina eddy" that can bring pollutants up the coast from the Los Angeles basin and a post-Santa Ana event where the air pollutants that were pushed offshore come slowly back to the coast. Another type of pattern that would bring moderate levels of air pollutants to the Channel Islands is an eastern Pacific high pressure system that causes light winds and poorly dispersed air. Normally, the sea breeze pushes the air pollutants to the coast and keeps low levels of air pollutants in the Channel Islands.

Terrestrial Environment

Introduction

This section provides a description of the terrestrial component of Anacapa Island that is directly related to conditions addressed in the alternatives. As such, it is not a complete description of the entire terrestrial environment. This chapter is organized to focus on the sub-issues identified for the terrestrial environment using the best information available. This chapter will also include descriptions of the significant conditions and trends of the resources that may be affected by the proposed project or its alternatives. Listed below are the four terrestrial components that will be described in this section:

- Invertebrates
- Herpetofauna
- Avian
- Mammals

Invertebrates

Current Status

A natural resources study completed by the Santa Barbara Museum of Natural History (Miller and Hochberg 1979) generally described the dominant insects on Anacapa Island. The survey focused on insects that would have been of special interest to the Park such as, endemics and pests. Since that time, several studies have added to the knowledge base of invertebrate species for Anacapa Island. In the Parks *Terrestrial Invertebrate Monitoring Handbook* (Fellers 1991), the Park provided an update of invertebrate fauna that was known to exist on Anacapa Island. Table 5 shows a comparison of the species identified in 1979 by Hochberg and Miller (1979) and the current state of knowledge. Table 6 describes the number and proportion of endemic terrestrial invertebrate taxa on Anacapa Island.

The Parks report (1989) states that despite the increasing knowledge of the composition of the terrestrial invertebrate fauna, there is still an almost complete lack of data on the ecology, distribution and

abundance of invertebrates on the park islands.

Table 5. Terrestrial Invertebrates known from Anacapa in 1979 (Hochberg 1979; Miller 1979) and 1989.

Taxa	1979	1989
Snails	2	2
Insects	94	130
Other Arthropods	3	7
Total	**99**	**139**

Trend

Channel Islands National Park developed a Terrestrial Invertebrate Monitoring Handbook (Fellers and Drost 1991) for the purpose of detecting significant changes in the diversity, abundance and distribution of terrestrial invertebrates. Because of the isolation of the Islands, the Park is especially interested in expansion of non-native invertebrates into native plant communities. Unfortunately, due to budgetary and personnel constraints the monitoring program has not been implemented. As a result, trend estimates for the invertebrate population's "health" on Anacapa Island is not known.

Table 6. Number and proportion of endemic taxa on Anacapa Island (Fellers and Drost 1991).

Taxa	No. of Species	Total Endemic (percent)
Snails	2	1(50)
Arthropods	137	18(13)

Herpetofauna

Current Status

Herpetofauna for this discussion includes native amphibians and reptiles on Anacapa Island. Only one native amphibian, the Pacific Slender Salamander (*Batrachoseps pacificus pacificus)* and two native lizards, the Side-blotched Lizard (*Uta stansburiana*) and the Southern Alligator Lizard (*Elgaria multicarinatus),* occur on Anacapa Island.

In 1988 the Park published a protocol (Fellers et. al. 1988) for monitoring terrestrial vertebrates within the Park. A significant portion of the monitoring protocol was directed at monitoring the Park's amphibians and reptiles. The purpose of monitoring was to determine population status. Population status was reported using two parameters; 1) an uncalibrated index of population size and, 2) weight-length regression. The population index allows the park to track changes in population size and thus detect both long-term trends and sudden, short-term changes. The weight-length regression provides a measure of the general health of the population.

Trend:

Data collection on the reptiles and amphibian monitoring began in 1993. Figure 2 shows the population index for both species.

Normal year-to-year changes can be expected for the salamander because their activities are strongly moderated by rainfall. As shown in Figure 2 the population index for the pacific salamander increased dramatically during the wet winter season of 1997-98.

Avian

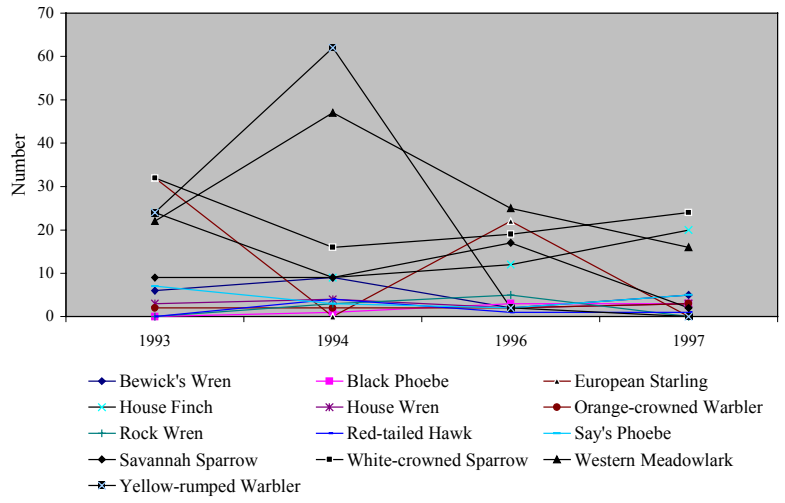
Landbirds

Current Status

Twenty-two species of landbirds are known to breed on Anacapa Island (Diamond and Jones 1980). Seven of these taxa are recognized as endemic subspecies, occurring only on Anacapa and one or more of the other Channel Islands (Johnson 1972). These endemic species include the Allen's Hummingbird (*Selasphorus sasin sedentarius*), Pacific-slope Flycatcher (*Empidonax difficilis insulicola*), Horned Lark (*Eremophila alpestris insularis*), Bewick's Wren (*Thryomanes bewickii newophilus*), Loggerhead Shrike (*Lanius ludovicianus anthonyi*), Orange-crowned Warbler (*Vermivora celata sordida*), House Finch (*Carpodacus mexicanus frontalis*) and Rufous-crowned Sparrow (*Aimophila ruficeps obscura*).

Not all of the species that are known to breed on Anacapa Island were observed during the 1995-1997 National Park Service surveys. Middle and West Anacapa Island were not included in the transects and could have contained breeding landbirds (Austin and Coonan 1998). West Anacapa Islet provides the best landbird habitat out of the three Anacapa islets, due to its greater topography and more extensive stands of native shrub vegetation, including coastal sage scrub and coreopsis scrub. A complete list of landbirds found on Anacapa Island can be found in the Appendix.

Figure 3. East Anacapa Island Fall Landbird Counts



Trend:

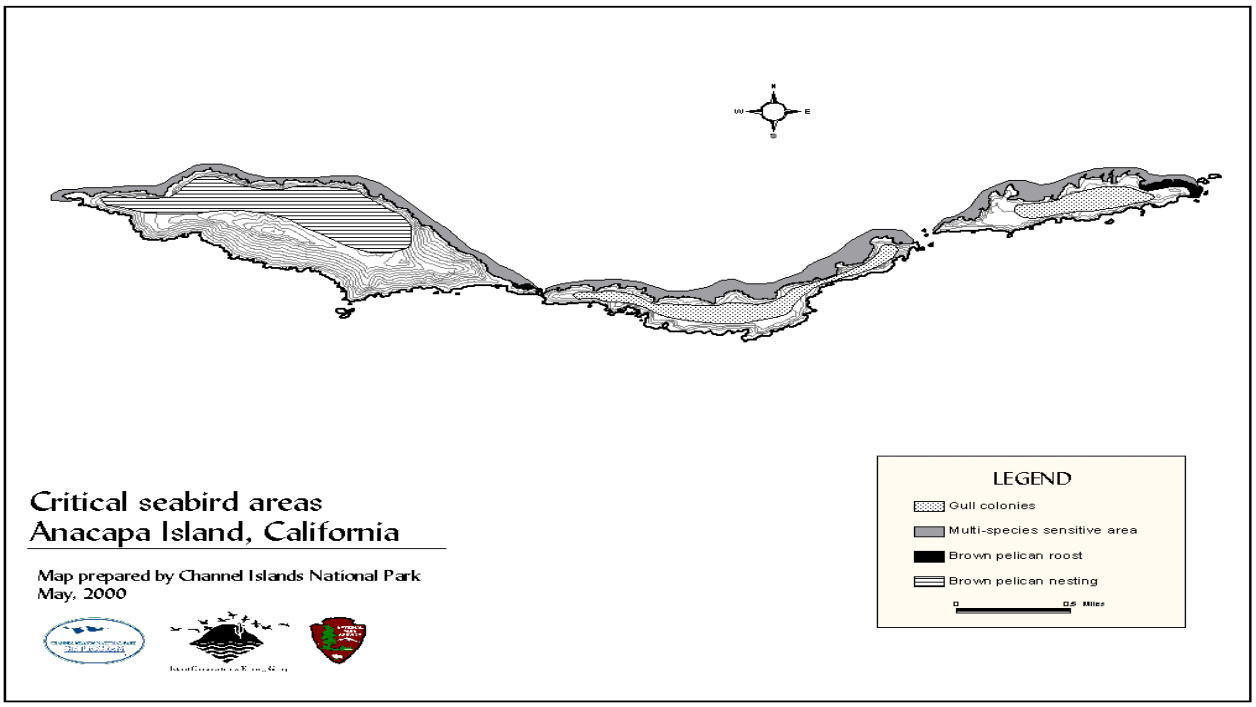
Part of the terrestrial monitoring program at Channel Islands is focused on monitoring landbirds. The objective of the monitoring program is to provide, on an annual basis, species and numbers of breeding land birds on Park Islands. Counts are made to provide information on relative abundance of all breeding birds on each island during breeding and non-breeding periods each year.

Seabirds

Current Status

Currently there are eight species of nesting seabirds on Anacapa Island. Of the eight species, three are classified as being Species of Special Concern in California. These Species of Special Concern include

Figure 4. Critical Seabird Areas.



the Ashy Storm-Petrel (*Oceanodroma homochroa*), Double-crested Cormorant (*Phalacrocorax auritus*), and the Xantus' Murrelet (*Synthilboramphus hypoleuca*) (California Department of Fish and Game 1992). The Xantus' Murrelet is also listed as a Federal Species of Concern (U.S. Fish and Wildlife Service 1998). The Channel Islands National Park also provides one hundred percent of the state's population of nesting Xantus' Murrelet. Figure 4 shows the critical seabird areas on Anacapa Island.

One of the breeding seabirds on Anacapa Island is the California Brown Pelican (*Pelecanus occidentalis californicus*), which is listed as a federal Endangered species. One hundred percent of the state's population of nesting California Brown Pelican occurs on Anacapa and Santa Barbara Island. Because of its significance as a listed species under the Endangered Species Act, the Park will be consulting with the U.S. Fish and Wildlife Service on this project.

Factors that threaten nesting seabirds on Anacapa Island include predation by introduced Black Rats (*Rattus rattus*), oil pollution, organochlorines, and gill nets (Drost and Lewis 1995). The introduction of non-native plant species may play a role in loss of habitat, but the numbers of nesting seabirds on Anacapa Island are still relatively low compared to the available habitat.

Trend

Brown Pelican

In the 1950's the pesticide DDT heavily impacted Brown Pelicans. The pesticide was concentrated as it moved up the food chain and in Pelicans and other predatory birds caused the eggshells to be so thin that the incubating adult crushed the eggs. By

1968 the population was so low that only 100 pairs bred on Anacapa Island and only four chicks fledged. For this reason, Brown Pelicans were listed as a Federally Endangered Species. DDT was banned in the U.S. in 1972 and since then Brown Pelican numbers have increased. Today they are close to, or above historical population sizes, making the Brown Pelican a conservation success story.

Today Brown Pelicans are susceptible to pollution (especially oil spills and fishing gear entanglement), disturbance, and predation of eggs and young chicks by introduced species.

Brown Pelicans are particularly susceptible to disturbance in the early part of the breeding season; during incubation and the first three weeks of chick rearing. During this period, if adults are disturbed they will fly off the nest leaving the eggs or young chicks exposed to heat, cold, or gull and raven predation. For this reason, breeding colonies such as Anacapa Island must be strictly protected during the breeding season. Even a single group of visitors during the breeding season can result in complete breeding failure over large parts of the colony.

During the non-breeding season Brown Pelicans are much less susceptible to disturbance. They will fly off if approached closely, but the only impact this has on individuals is the energetic cost of flying away and the time lost flying that could be used for preening or resting. In addition, adults are much less likely to be energetically stressed during the non-breeding season when they are non-involved in courtship or chick rearing. Consequently, during the non-breeding season, single disturbance events will have little impact on Brown Pelican populations. However, repeated disturbance of non-breeding Brown Pelicans could have a cumulative impact if it caused a significant energetic drain or significantly reduced time available for preening.

Species of Special Concern

Two of the species of concern are sea cave/crevice nesting seabirds that are susceptible to disturbance. These species Ashy Storm-Petrel (*Oceandodroma homochroa)* and Xantus' Murrelet (*Synthliboramphus hypoleucus)* nest in similar habitats on Anacapa Island. Population decline in both species has been documented by Sydeman et al. (1998).

The executive committee of the Pacific Seabird Group has authorized a committee to draft a petition to list the Xantus' Murrelet for protection under the Endangered Species Act. The Pacific Seabird Group, however, has yet to render an opinion on the merits or reasons for listing Xantus' Murrelet.

In addition to rat impacts on the murrelet, other disturbance factors such as oil pollution and the associated impacts (increased predation, disorientation, disruption) from bright lights from squid boats who fish adjacent to Anacapa Island may be contributing factors to the decline of the Xantus' Murrelet population.

An assessment of nesting habitat confirmed the impacts of introduced predators on the Xantus' Murrelet on Anacapa Island. Of the estimated 505 potential nesting sites accessible to rats, only two sites, or 0.4%, had evidence of nesting murrelets (McChesney et al. 2000). Both eggs showed evidence of mammalian predation and were in areas where rats

appeared to be common. In contrast, on rat-free Santa Barbara Island similar surveys in 1991 found murrelet eggshells in 29.4% of potential sites. Murrelets on Anacapa Island are mostly limited to nesting in areas inaccessible to rats or where rats occur infrequently.

Mammals

Current Status

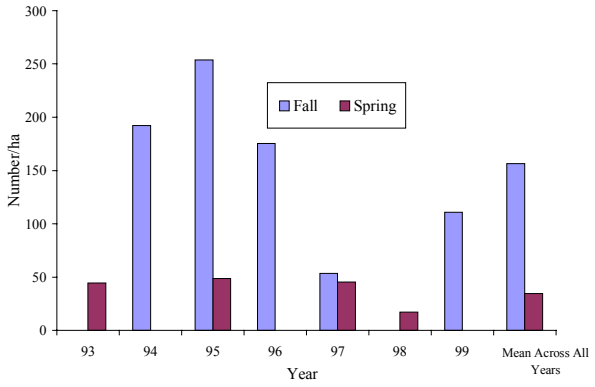
The Deer Mice on Anacapa (*Peromyscus maniculatus anacapae)* and Santa Barbara Islands (*Peromyscus maniculatus elusus)* are the largest native land mammal. Both subspecies are endemic and restricted to their respective island. As abundant generalist granivores/predators, they undoubtedly have significant influence on the plants and terrestrial invertebrates on the islands, as prey species, they largely determine the numbers of some of the resident hawks and owls (Fellers et al. 1988).

As part of its vertebrate monitoring program, the Park has been monitoring mouse populations on Anacapa since the spring of 1993. Monitoring of Deer Mice employs mark-recapture grids (Fellers et al. 1988). There are currently 3 grids set up on Anacapa Island, one on each islet. The grids are monitored in the spring and late summer/fall of each year.

Trend

Mouse trapping has been conducted on Santa Barbara Island since the early 1980's. One of the most significant findings from this data is that there are large fluctuations in population levels that are related to annual rainfall, predation pressure, and season (Fellers et al. 1988). C. Drost and others, have hypothesized that breeding suppression is the ultimate factor limiting the Deer Mouse population on Santa Barbara Island. (This fluctuation has resulted in densities from less than 10 mice/ha to over 450 mice/ha. Summarized in Figure 5 are the mouse densities from Anacapa Island since 1993.

Figure 5: Mean Deer Mice Densities (No/ha) Anacapa Island.



Rare, Threatened and Endangered Plants

Current Status

There is only one federally endangered plant on Anacapa Island: Island Malacothrix (*Malacothrix squalida*). It occurs only on Santa Cruz Island and Middle Anacapa. On Middle Anacapa it is found in two locations: near the Knife's Edge and on an east facing slope near the west end of the island.

It is an annual herb from the aster family. It ocurs on rocky coastal bluffs in coastal scrub.

Trend

Island Malacothrix has been documented from Middle Anacapa Island on two occasions: when it was first collected in 1963 and again by Steve Junak in 1998. Local populations of Island Malacothrix on Anacapa Island are impacted by soil, habitat alteration, and localized impacts from seabird nesting. Its limited occurrence makes it highly susceptible to stochastic events which could lead to extirpation from Anacapa Island.

Marine Environment

Marine Mammals

Two species of marine mammals utilize habitat areas on or around the shores of Anacapa Island. These species, the California Sea Lion (*Zalophus californianus*) and the Harbor Seal (*Phoca vitulina*), are year round residents. Both species are abundant and widely distributed throughout the area.

California Sea Lion

Current Status

California Sea Lions are the most conspicuous and abundant pinnipeds in the coastal waters of southern California. The principal breeding rookeries in the Channel Islands are on the western end of San Miguel Island, including Castle Rock, the offshore sides of San Clemente and San Nicolas Islands, and around Santa Barbara Island. They haul out on all of the southern California Islands (Bartholomew et al 1970).

On Anacapa Island California Sea Lions are known to haul out, in varying numbers, at two locations. These locations are both on south shore of the East Islet. Although pupping has been observed in these two areas, overall habitat quality is limited due to the marginal beaches on Anacapa (narrow and rocky and can be completely submerged during high tide), and heavy visitation (on-shore and off-shore).

California Sea Lions are opportunistic feeders, and feed in large groups when schooling fish or squid are available and probably disband when the food source is scattered (Bonnel et al. 1979). Feces analysis of California Sea Lions from San Miguel Island showed squid, Pacific Hake, rockfish, and a variety of other schooling pelagic and demersal fishes (benthic fishes) to be utilized (Antonelis et al. 1978).

Incidental set and drift gillnet fishing continues to be the leading human caused mortality factor. However, for the first three-quarters of 1994, when compared to the years 1991-93, incidental gillnet kills showed a large reduction (Barlow et al. 1995).

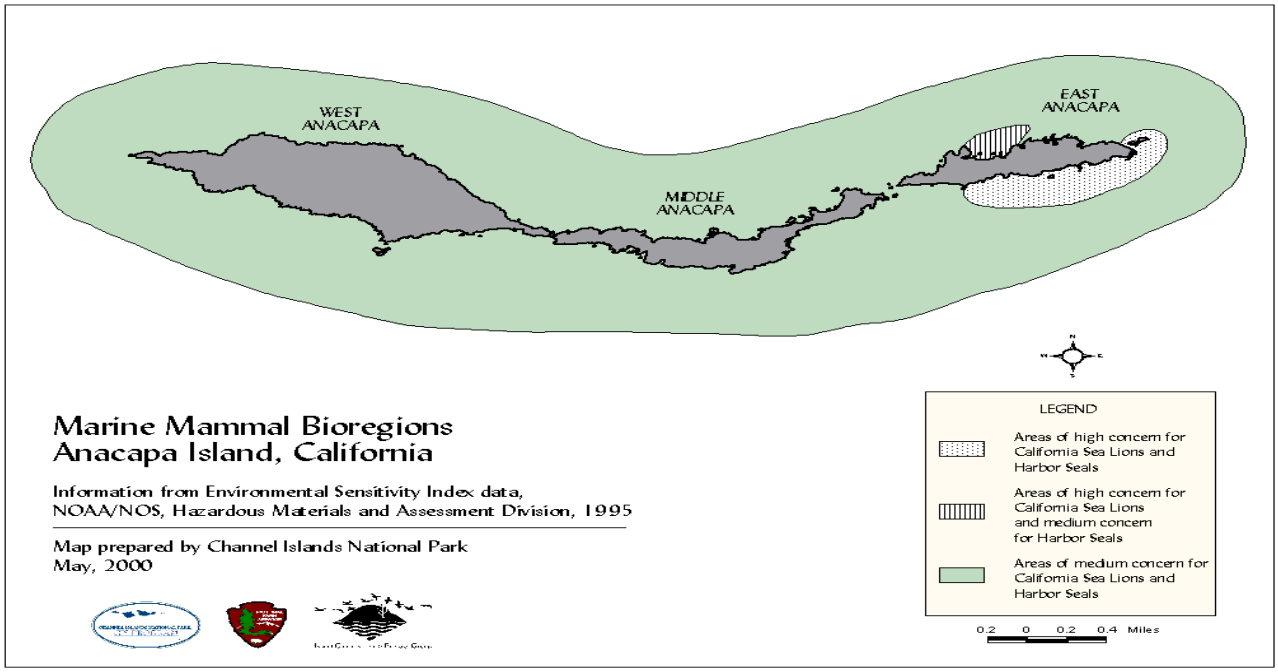
Trend

Specific population trends for Anacapa Island is not known. However, population trends for four southern California rookeries, which includes rookeries from the Channel Islands, were estimated by Barlow et al. (1995). With the exception of the El Nino events of 1983 and 1992, pup counts increased at an annual rate of 5.2% between 1975 and 1994. Pup counts between the El Nino events increased at 8.8% between 1976 and 1982 and at 8.2 % between 1983 and 1994 (Barlow et al. 1995).

Harbor Seal

Current Status

Figure 6. Marine Mammal Bioregions



Harbor seals are occasionally seen in and around harbors, such as the Ventura Marina, breakwaters and jetty. Traditionally they seek to avoid the disturbance that usually accompanies the activities of humans. They are much more wary than any other pinnipeds of the Channel Islands area and can only be approached closely with great caution (Bartholmew et al. 1970). Generally they haul out and breed only on the most secluded beaches, rocks, and mud flats available, usually avoiding areas inhabited by other species of pinnipeds (Bigg 1969).

Harbor seals occur on inaccessible areas of the south shores of all three islets. While pups have been observed on southern West Islet the role of Anacapa as a hauling and breeding ground is unclear. Harbor seal movement is usually confined to less than 500 km from their pupping sites. The gillnet fishery is the leading human caused mortality factor for the Harbor Seal. Barlow (1995) notes that gillnet mortality may reach as high as 5-10% of the California Harbor Seal population.

Trend

Population size for California Harbor Seals is estimated by counting the number of seals ashore during the peak haul-out period (May/June) and multiplied by a correction factor that estimates the number of seals on land to those in the water. Harbor seal counts have continue to increase each year except during El Nino events of 1983 and 1993. Annual population has been estimated for the islands, and show a stable population between 1983 through 1995 (Barlow et al. 1995).

Marine Invertebrates

Current Status

Intertidal invertebrates have been monitored by the Park since 1982 with the following goals: 1) monitor trends in population dynamics; 2) determine normal limits of variation; 3) discover abnormal conditions; 4) provide remedies for management problems; and 5) measure the effects of management actions. Fifteen sites on four park islands are monitored each spring and fall.

Trend

For the species that were monitored as part of the intertidal monitoring surveys percent cover did not vary more than 10% (See Figure 7). The biggest decline detected by the monitoring program is for black abalone. Since 1985 when over 900 black abalone were counted across all Anacapa monitoring zones, the population declined significantly with no individuals being counted the last two years (See Figure 8)

Figure 7. Average Percent Cover of Intertidal Zone, Anacapa Island (Across all Zones)

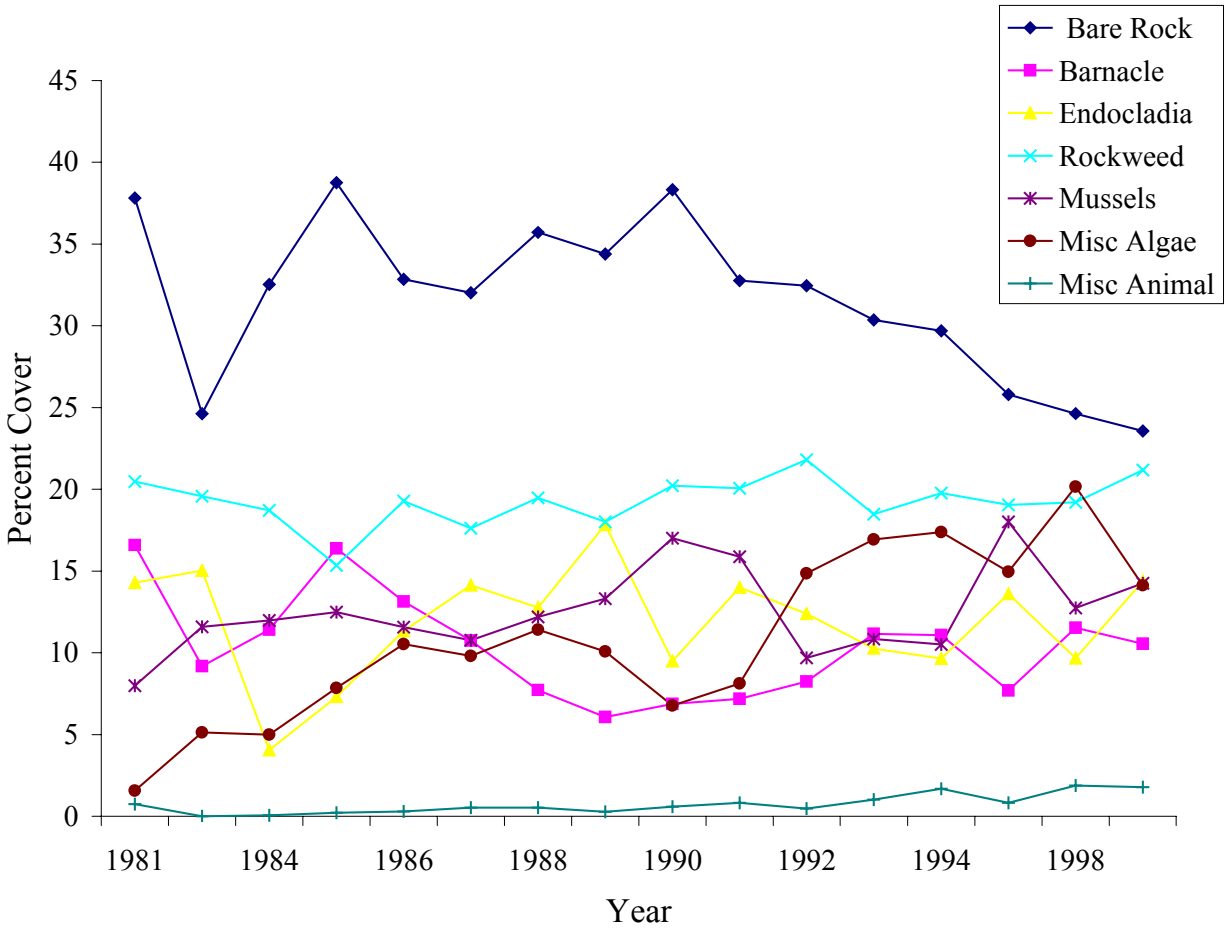
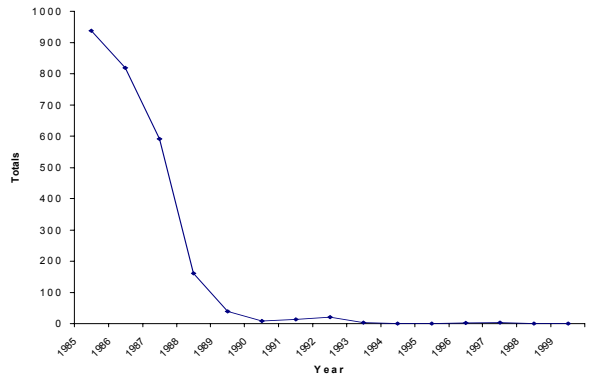


Figure 8. Anacapa Black Abalone Counts



Human Uses and Values

Channel Islands National Park, and specifically Anacapa Island are recognized locally, nationally, and internationally as an area of exceptional scientific value with irreplaceable cultural resources, notable geological and paleontological features and plant and animal communities that have evolved in a unique manner because of their isolation from the mainland. The waters surrounding the islands contain one of the most diverse and productive marine ecosystems in the world.

Anacapa Island and its surrounding waters have status as both a state of California ecological reserve (surrounding waters to 1 nautical mile) and a federal research natural area. As an ecological reserve boating activities close to shore are prohibited along parts of West Islet for the protection of nesting pelicans. West and Middle Islet have status as a research natural area and are closed for from public use with the exception of Frenchy's Cove.

As an area of such diverse and important resources, the Park attracts a wide array of people to the islands. In addition to the 16,000 annual visitors to the island, various scientists, and Park personnel frequent the island as well. Not included in this statistic is the number of people who recreate with private boats, or who conduct commercial fishing operations around the waters of Anacapa Island. Figure 9 shows the monthly average for the years 1996-99 of campers and visitors who come ashore.

Park concessionaires provide most of the public transportation to Anacapa Island. Trips to Anacapa are scheduled almost daily throughout the summer and at least on weekends throughout the rest of the year. The trips can last all day or half day. Visitors are only allowed on East Anacapa Island or Frenchy's Cove when conditions permit.

Figure 9. Campers and Visitors Ashore

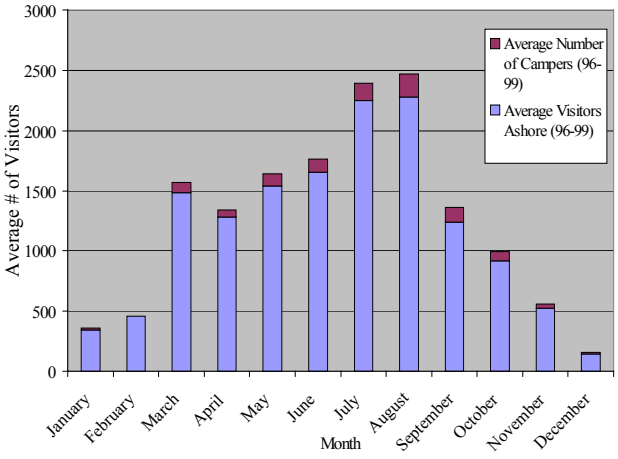


Figure 10. Facilities and Trails.